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SCIENCE NEWS LETTER

THE WEEK'S SUMMARY OF CURRENT SCIENCE • JULY 24, 1945

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No Recoil
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A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

Science Reconversion

Senate subcommittee on war mobilization report makes recommendations to keep up the necessary scientific work for national welfare.

► TO AID the war-to-peace reconversion of scientific research and sustain the research and development necessary to national defense, health and medical care, industry, agriculture and business, the Senate's subcommittee on war mobilization headed by Sen. Harley M. Kilgore, of West Virginia, recommends in a report that Congress create a National Science Foundation as an independent governmental agency.

Federal research expenditures rose to \$706,000,000 in 1944, a ten-fold increase over 1938, the report states, while the total research investment by private organizations and government was over \$800,000,000. Before the war, the nation was spending between \$300,000,000 and \$400,000,000 a year for research, about a fifth of it governmental. Thus there would be a gap of from \$400,000,000 to \$500,000,000 if we revert to the prewar rate of research.

The proposed new central scientific agency of the government would take up some of this gap through use of public funds as well as "coordinate all such federally supported research and development work, utilizing so far as possible the existing resources of public and private research organizations, particularly nonprofit educational institutions and research foundations."

The National Science Foundation would be headed by a director appointed by the President and confirmed by the Senate. Fund allocations and other actions would be approved by a National

Science Board consisting of the director as chairman, eight Presidentially appointed members at large, and the Secretaries of War, Navy, Interior, Agriculture, Commerce, and Labor, the Attorney General, and the head of the Federal Security Agency or their representatives.

At least 20% of the annual research appropriations would be reserved for each of three fields: National defense, health and medical care, and basic sciences. At least half of the funds would be earmarked for non-profit educational and research institutions.

The new foundation would not itself perform research and development work, but would make funds available to public and private organizations already equipped and staffed.

The foundation would also be empowered to grant fellowships and scholarships in various fields of science in order to "discover and develop scientific talent, particularly in American youth."

"To protect the taxpayer's interest," the report states, "all research and development projects financed in whole or in part by the federal government should be undertaken only upon the condition that any invention or discovery resulting would become the property of the United States." The foundation would grant without charge nonexclusive licenses to persons or organizations wishing to use any such invention, discovery, patent or patent right.

Science News Letter, July 28, 1945

MEDICINE

Life-Restoring Method

► THE CLAIM that life has been restored in 12 of 51 fatally wounded Red Army officers and men is reported by Sergei Belayev in the *American Review of Soviet Medicine* (June).

The method used consisted in supplying oxygen to the lungs directly by a pulmotor and injecting blood not only into a vein but also into an artery of the arm in the direction of the heart. This is said to restore nourishment to the heart muscle.

The method was developed by Prof. V. A. Negovski, director of the laboratory of experimental physiology at the All-Union Institute of Experimental Medicine.

The case of Valentin Cherepanov, private in the Red Army, now alive after being declared dead by a physician, is reported in some detail.

He had been seriously wounded in the thigh and was brought to a field hospital unconscious and in a serious state.

He was placed immediately on the operating table but his condition grew worse. Heart action and breathing ceased and reflexes were absent. The surgeon's entry in the case history was:

"Death following shock and acute hemorrhage on March 3, 1944, at 14:41."

Three and one-half minutes later a specially trained group of doctors went to work on the soldier's body. One minute later, Mr. Belayev reports, his heart started to beat and after three minutes breathing started. Within an hour he had recovered consciousness, opened his eyes when his name was called, answered questions and asked for a drink of water. Today he feels perfectly well but is under observation at the All-Union Institute.

Less fortunate were some of the other 51 on whom the Negovski method was tried. In some life was restored but lasted only a few hours or days.

Science News Letter, July 28, 1945

CHEMISTRY

Wax-Free Lubricant Has Unusual Advantages

► A NEW non-petroleum lubricant for automobile, aircraft and other internal combustion engines has been developed and tested that is claimed to have unusual advantages over mineral oil, particularly in cold weather. Its properties are quite different in many respects from oils derived from petroleum. It is wax-free and can be made to any desired viscosity.

The lubricant is a product of Carbide and Carbon Chemicals Corporation and is now being produced in commercial quantities. Its use in engines has been studied for several years in a large number of vehicles. Large quantities are in use in military equipment, and, at the present time, sale of the material is limited to war uses.

No petroleum oils are contained in the new lubricant. It has a density approximating that of water. It is characterized by low change in viscosity with change of temperature. Carbon residue values are very low. Sludge and varnish formation in the engine is practically eliminated when the new lubricant is used, and wear of moving parts is in line with wear experience with ordinary mineral oils.

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Tetanus antitoxin, used to prevent lockjaw, is an antibody obtained from the blood of horses; unless renewed it gives the human body only ten days' protection.

GENERAL SCIENCE

Research Agency Planned

OSRD responds to request of President Roosevelt by urging new National Research Foundation to aid research and scholarships for potential scientists.

On November 17, 1944, President Franklin D. Roosevelt wrote to Dr. Vannevar Bush, director of the Office of Scientific Research and Development, requesting recommendations on four points. The first had to do with the release of results of scientific research made during wartime. The second referred to organization of a program for continuing the war against disease. The third dealt with possible government aid to the research of public and private organizations. And the fourth was concerned with a program for discovering and developing scientific talent in American youth "so that the continuing future of scientific research in this country may be assured."

The following is a summary of the report containing the requested recommendations. Dr. Bush was aided by four committees headed respectively by Dr. W. W. Palmer, Columbia University; Dr. Isaiah Bowman, Johns Hopkins University; Henry Allen Moe, Guggenheim Memorial Foundation; and Dr. Irvin Stewart, National Research Council.

By DR. VANNEVAR BUSH

Director, Office of Scientific Research and Development

► PROGRESS in the war against disease depends upon a flow of new scientific knowledge. New products, new industries, and more jobs require continuous additions to knowledge of the laws of nature, and the application of that knowledge to practical purposes. Similarly, our defense against aggression demands new knowledge so that we can develop new and improved weapons. This essential, new knowledge can be obtained only through basic scientific research.

Science can be effective in the national welfare only as a member of a team, whether the conditions be peace or war. But without scientific progress no amount of achievement in other directions can insure our health, prosperity, and security as a nation in the modern world.

For War Against Disease

We have taken great strides in the war against disease. The death rate for all diseases in the Army, including overseas forces, has been reduced from 14.1 per thousand in the last war to 0.6 per thousand in this war. In the last 40 years life expectancy has increased from 49 to 65 years, largely as a consequence of the reduction in the death rates of infants and

children. But we are far from the goal. The annual deaths from one or two diseases far exceed the total number of American lives lost in battle during this war. A large fraction of these deaths in our civilian population cut short the useful lives of our citizens. Approximately 7,000,000 persons in the United States are mentally ill and their care costs the public over \$175,000,000 a year. Clearly much illness remains for which adequate means of prevention and cure are not yet known.

The responsibility for basic research in medicine and the underlying sciences, so essential to progress in the war against disease, falls primarily upon the medical schools and universities. Yet we find that the traditional sources of support for medical research in the medical schools and universities, largely endowment income, foundation grants, and private donations, are diminishing and there is no immediate prospect of a change in this trend. Meanwhile, the cost of medical research has been rising. If we are to maintain the progress in medicine which has marked the last 25 years, the Government should extend financial support to basic medical research in the medical schools and in universities.

For Our National Security

The bitter and dangerous battle against the U-boat was a battle of scientific techniques—and our margin of success was dangerously small. The new eyes which radar has supplied can sometimes be blinded by new scientific developments. V-2 was countered only by capture of the launching sites.

We cannot again rely on our allies to hold off the enemy while we struggle to catch up. There must be more—and more adequate—military research in peacetime. It is essential that the civilian scientists continue in peacetime some portion of those contributions to national security which they have made so effectively during the war. This can best be done through a civilian-controlled organization with close liaison with the Army and Navy, but with funds direct from Congress, and the clear power to initiate military research which will sup-



NOT THE MOON!—This is the eighty-five percent eclipsed sun as it rose over a ridge of the east Rocky Mountains near Butte, Montana, on July 9. This picture was taken with a ten-foot camera. Photograph from Peter A. Leavens and George V. Plachy, New York Amateur Astronomers' Association-Sperry Gyroscope Company expedition.

plement and strengthen that carried on directly under the control of the Army and Navy.

And for Public Welfare

One of our hopes is that after the war there will be full employment. To reach that goal the full creative and productive energies of the American people must be released. To create more jobs we must make new and better and cheaper products. We want plenty of new, vigorous enterprises. But new products and processes are not born full-grown. They are founded on new principles and new conceptions which in turn result from basic scientific research. Basic scientific research is scientific capital. Moreover, we cannot any longer depend upon Europe as a major source of this scientific capital. Clearly, more and better scientific research is one essential to the achievement of our goal of full employment.

How do we increase this scientific capital? First, we must have plenty of men and women trained in science, for upon them depends both the creation of new knowledge and its application to practical purposes. Second, we must strengthen the centers of basic research which are principally the colleges, uni-

Science— Endless Frontier

"New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war we can create a fuller and more fruitful employment and a fuller and more fruitful life."

FRANKLIN D. ROOSEVELT.

November 17, 1944.

versities, and research institutes. These institutions provide the environment which is most conducive to the creation of new scientific knowledge and least under pressure for immediate, tangible results. With some notable exceptions, most research in industry and in Government involves application of existing scientific knowledge to practical problems. It is only the colleges, universities, and a few research institutes that devote most of their research efforts to expanding the frontiers of knowledge.

Expenditures for scientific research by industry and Government increased from \$140,000,000 in 1930 to \$309,000,000 in 1940. Those for the colleges and universities increased from \$20,000,000 to \$31,000,000, while those for the research institutes declined from \$5,200,000 to \$4,500,000 during the same period. If the colleges, universities, and research institutes are to meet the rapidly increasing demands of industry and Government for new scientific knowledge, their basic research should be strengthened by use of public funds.

For science to serve as a powerful factor in our national welfare, applied research both in Government and in industry must be vigorous. To improve the quality of scientific research within the Government, steps should be taken to modify the procedures for recruiting, classifying, and compensating scientific personnel in order to reduce the present handicap of governmental scientific bureaus in competing with industry and the universities for top-grade scientific talent. To provide coordination of the common scientific activities of these governmental agencies as to policies and budgets, a permanent Science Advisory Board should be created to advise the executive and legislative branches of Government on these matters.

The most important ways in which the Government can promote industrial research are to increase the flow of new scientific knowledge through support of

basic research, and to aid in the development of scientific talent. In addition, the Government should provide suitable incentives to industry to conduct research, (a) by clarification of present uncertainties in the Internal Revenue Code in regard to the deductibility of research and development expenditures as current charges against net income, and (b) by strengthening the patent system so as to eliminate uncertainties which now bear heavily on small industries and so as to prevent abuses which reflect discredit upon a basically sound system. In addition, ways should be found to cause the benefits of basic research to reach industries which do not now utilize new scientific knowledge.

Renew Scientific Talent

The responsibility for the creation of new scientific knowledge—and for most of its application—rests on that small body of men and women who understand the fundamental laws of nature and are skilled in the techniques of scientific research. We shall have rapid or slow advance on any scientific frontier depending on the number of highly qualified and trained scientists exploring it.

The deficit of science and technology students who, but for the war, would have received bachelor's degrees is about 150,000. It is estimated that the deficit of those obtaining advanced degrees in these fields will amount in 1955 to about 17,000—for it takes at least 6 years from college entry to achieve a doctor's degree or its equivalent in science or engineering. The real ceiling on our productivity of new scientific knowledge and its application in the war against disease, and the development of new products and new industries, is the number of trained scientists available.

The training of a scientist is a long and expensive process. Studies clearly show that there are talented individuals in every part of the population, but with few exceptions, those without the means of buying higher education go without it. If ability, and not the circumstance of family fortune, determines who shall receive higher education in science, then we shall be assured of constantly improving quality at every level of scientific activity. The Government should provide a reasonable number of undergraduate scholarships and graduate fellowships in order to develop scientific talent in American youth. The plans should be designed to attract into science only that proportion of youthful talent appropriate to the needs of science in re-

lation to the other needs of the nation for high abilities.

Include Those in Uniform

The most immediate prospect of making up the deficit in scientific personnel is to develop the scientific talent in the generation now in uniform. Even if we should start now to train the current crop of high-school graduates none would complete graduate studies before 1951. The Armed Services should comb their records for men who, prior to or during the war, have given evidence of talent for science, and make prompt arrangements,

SCIENCE NEWS LETTER

Vol. 48 JULY 28, 1945 No. 4

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C. North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents. Monthly Overseas Edition: By first class mail to members of the U. S. armed forces, \$1.25 a year. To others outside continental U. S. and Canada by first class mail where letter postage is 3 cents, \$1.25; where letter postage is 5 cents, \$1.50; by airmail, \$1.00 plus 12 times the half-ounce airmail rates from U. S. to destination.

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Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature. Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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consistent with current discharge plans, for ordering those who remain in uniform, as soon as militarily possible, to duty at institutions here and overseas where they can continue their scientific education. Moreover, the Services should see that those who study overseas have the benefit of the latest scientific information resulting from research during the war.

Lid Must Be Lifted

While most of the war research has involved the application of existing scientific knowledge to the problems of war, rather than basic research, there has been accumulated a vast amount of information relating to the application of science to particular problems. Much of this can be used by industry. It is also needed for teaching in the colleges and universities here and in the Armed Forces Institutes overseas. Some of this information must remain secret, but most of it should be made public as soon as there is ground for belief that the enemy will not be able to turn it against us in this war. To select that portion which should be made public, to coordinate its release, and definitely to encourage its publication, a Board composed of Army, Navy, and civilian scientific members should be promptly established.

Program for Action

The Government should accept new responsibilities for promoting the flow of new scientific knowledge and the development of scientific talent in our youth. These responsibilities are the proper concern of the Government, for they vitally affect our health, our jobs, and our national security. It is in keeping also with basic United States policy that the Government should foster the opening of new frontiers and this is the modern way to do it. For many years the Government has wisely supported research in the agricultural colleges and the benefits have been great. The time has come when such support should be extended to other fields.

The effective discharge of these new responsibilities will require the full attention of some over-all agency devoted to that purpose. There is not now in the permanent Governmental structure receiving its funds from Congress an agency adapted to supplementing the support of basic research in the colleges, universities, and research institutes, both in medicine and the natural sciences, adapted to supporting research on new weapons for both Services, or adapted to administer-

ing a program of science scholarships and fellowships.

Therefore I recommend that a new agency for these purposes be established. Such an agency should be composed of persons of broad interest and experience, having an understanding of the peculiarities of scientific research and scientific education. It should have stability of funds so that long-range programs may be undertaken. It should recognize that freedom of inquiry must be preserved and should leave internal control of policy, personnel, and the method and

scope of research to the institutions in which it is carried on. It should be fully responsible to the President and through him to the Congress for its program.

Early action on these recommendations is imperative if this nation is to meet the challenge of science in the crucial years ahead. On the wisdom with which we bring science to bear in the war against disease, in the creation of new industries, and in the strengthening of our Armed Forces depends in large measure our future as a nation.

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ORDNANCE

Kickless Cannon

Secret of the recoilless operation lies in construction of breech and of cartridge case. It is very accurate and so light that it can be carried by hand.

See Front Cover

➤ A ONE-MAN cannon, which fires without recoil, and enables the front-line infantryman to hurl regular artillery-type shells at enemy tanks and pillboxes with the accuracy of a sniper's rifle, is the newest weapon to be put into the hands of American fighters, the War Department has disclosed. It has already been combat-tested, with highly satisfactory results.

Secret of the recoilless operation lies in the construction of the breech, and of the cartridge case that fits into it. The breech, instead of being tightly closed to prevent the backward leakage of gases when the gun is fired, is purposely left partly open, with a series of tubes to guide the back-flash when it comes. The wall of the cartridge case is perforated, permitting part of the gases to flow outward and then back. The force of this purposely arranged back-flash is just suf-



LIFE MASK—This air soldier, just surfacing out of the depths of a Marianas' lagoon, demonstrates how crew members in ditched B-29's use their high altitude oxygen masks and "bail out" bottles to fight free of their submerged ship and get to surface. Air Technical Service Command photograph.

ficient to offset the gun's recoil, so that the gunner actually feels less "kick" on firing than he would from a .22 rifle.

As thus far disclosed, recoilless cannons are produced in two calibers. One, which may be fired bazooka-fashion over a single man's shoulder, has a caliber of 57 millimeters ($2\frac{3}{4}$ inches) and throws a $2\frac{3}{4}$ -pound projectile to a range of two miles, with muzzle velocity of 1,200 feet a second. The other, which can be set up on the ordinary .30-caliber machine-gun tripod, has a caliber of 75 millimeters (3 inches); it uses three types of projectiles varying in weight from 13 to 15 pounds. Its useful range runs up to four miles, with a 1,000-foot-per-second muzzle velocity.

Muzzle velocities are low and useful ranges are relatively short, in both these weapons. However, it is not anticipated that they will be employed up to the limits of even the range they have; they are intended primarily for infighting at a few hundred yards, where the remaining velocities of their shells will be more than sufficient for their purposes.

By achieving completely recoilless operation, these weapons have made it possible to carry artillery fire-power and accuracy right up into the line with riflemen and machine-gunners. Hitherto, some measure of this has been made possible through the use of mortars and rocket weapons; but both of these suffer from the dual handicaps of relative inaccuracy as compared with rifled weap-

ons, and very low velocity with consequent poor penetration when used against armor.

The new recoilless cannons are so accurate that it has been considered worthwhile to equip them with telescopic sights. Their gunners can pick their targets, such as the gun ports of concrete pillboxes or the turrets of tanks, with complete confidence of hitting them.

The guns are very light, largely because it has been possible to dispense with the recoil-absorbing springs and hydro-pneumatic cylinders that add so much weight to conventional-type artillery pieces. The 57-millimeter weapon (tube alone) weighs only about 40 pounds, so that one man can carry it on his shoulder. The 75-millimeter gun weighs 105 pounds; it can be carried over rough ground for at least short distances by from two to four men.

Every advantage, here as elsewhere, has its price. The purposely-arranged back-flash that offsets the recoil creates an area immediately to the rear of the breech where it is exceedingly unsafe to be when the gun is fired. Gun crews, as in the case of the bazooka and other rocket-firing weapons that also spit backwards when they go off, must be trained to work from alongside instead of from the rear as ordinary artillerymen do. Aside from this point to be remembered, there's nothing the matter with the new recoilless guns.

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PUBLIC HEALTH

Children Live Longer

Actual decrease in infant mortality is reported from Russia. Achievement is attributed to special pre-natal care and provisions for premature babies.

By N. EGOROV

Soviet Scientists Antifascist Committee

► CHILDREN of the USSR escaped during World War II the terrible consequences to life and health entailed by World War I. Owing to the endeavors of the government authorities, child mortality has actually decreased since the war broke out, and the figure now is less than two-thirds of what it was in 1940. The credit goes largely to the extensive work done in the prophylactic field, and it may here be said that prevention rather than cure is the keynote of the whole Soviet public health system.

In the care of mother and child, this

feature is particularly pronounced. The fight against child mortality begins in the pre-natal stage. The health of the expectant mother and her child is the constant care of special welfare centers. Here all expectant mothers secure advice and, if necessary, treatment free of charge; throughout the period of pregnancy they are under medical observation, and if any deviation from the normal is noted, the woman is placed in a special clinic.

The mothers-to-be are also instructed at these centers in pregnancy hygiene, infant care and feeding and the symptoms of the principal baby ailments—an invaluable aid to the mother, particularly

if the child is her first, in making herself and the home ready to receive the little newcomer to the family. To help the expectant mother with the various problems that arise, a midwife visits her at home, sees how she lives, and dispenses advice accordingly. For the confinement itself, there are in all the towns and district centers, special maternity homes or lying-in departments of the general hospitals.

In recent years, particular interest has developed in babies born prematurely. The records of the large obstetric clinics and the leading maternity homes reveal that a high percentage of survivals can be achieved. In the past few years hospital divisions for prematurely born babies have been opened in many of the Soviet towns and here the child spends, together with its mother, the first six or eight weeks of its life. The baby in this time progresses considerably towards normality, while the mother learns the special care it needs.

Nurses and doctors from the child welfare centers visit the homes of the babies under their supervision to see that they receive proper care and can develop normally. If the mother is ill and cannot nurse the child herself, or if her supply of milk is insufficient, the welfare center again comes to the rescue, for it has a donor station at which mothers with abundant milk can leave their surplus.

Then there are the nurseries and children's homes, where children are brought up under the supervision of competent medical and training personnel. The nurseries are for youngsters whose mothers work, while the children's homes take in children who have lost their parents or whose mothers are ill or alone. Between the ages of three and seven, children whose mothers go to work attend kindergartens. At seven the child goes to school, and here too it is under constant medical observation. The school doctors take measures for the prevention of contagious disease among the children in their charge, and physical training is also conducted under their supervision.

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Up to the time the yolk sac is absorbed and feeding begins fish are known as fry.

A new liquid insecticide, claimed to be effective in destroying chewing insects, is a sodium-antimony-lacto-phenate and will be known as SALP; although poisonous and toxic, it is relatively safe and economical.

INVENTION

Patent List Stirs Interest

Inventors may offer their devices for sale or licensing in simple, informal letter. Big as well as small businesses among those inquiring.

► THE U. S. Patent Office's newest service to the public, a register of patents available for licensing or sale, is arousing the interest of big industry as well as small business, where the liveliest response was expected from the first. In the correspondence received during the first month's existence of the Register have been letters and personal inquiries from representatives of some of the largest manufacturing concerns in the country. They are concerned not only with finding patents suitable for their use, but also with offering patents of their own for licensing to other producers.

Thus far, some 300 patents, held by about 200 inventors, have been offered for listing in the Register. Condensed, plain-English descriptions of a considerable number have already appeared in print. Those still unpublished are available for inspection at the Patent Office here.

Official red tape and long-winded legal jargon have been swept into the discard together, in the preparation of the new Register. The owner of the patent merely writes a letter, enclosing a copy of his patent or giving its number and enclosing ten cents to pay for a copy. He also makes the statement that he is willing to sell or license his rights in the patent on reasonable terms. The Patent Office then publishes a terse, one- or two-sentence description in the Register, giving the owner's address. Further negotiations are conducted directly between owner and prospective licensee or purchaser.

A mailing list is maintained, on which interested manufacturers may have their names entered on request. They will have marked copies of the Register mailed to them, calling attention to available patents in the particular class or category with which they are most concerned. A similar service is maintained for trade journals, which publish the descriptions for the benefit of their clients.

A few highlights from among the patents thus far listed:

Telephone lock, to prevent unauthorized use of telephone instruments for outgoing calls.

Compartmented cigarette package, from which empty cells are removed as cigarettes are used. Pack diminishes in size, but remaining cigarettes are protected against squashing.

Dictating machine vacuum cleaner, which sucks away wax dust from cylinders and deposits it in a suitable receptacle.

Mottled paint, consisting of drops of varicolored enamel immersed in liquid with which they will not mix. Spread by brush, they give mottled or streaked effect.

Electric light that, when dropped into water, turns itself over, floats to surface, and lights up.

Fireplace ashpan, with hinged cover to prevent contents from spilling during removal, adjustable to any size fireplace.

Measuring device consisting of small wheel to be rolled over line to be measured; can be set to click for any desired number of inches or feet.

Pilot light for electric iron, which indicates whether current is on or off.

Folding chair with detachable legs and back, which can be boxed in compact cylindrical container.

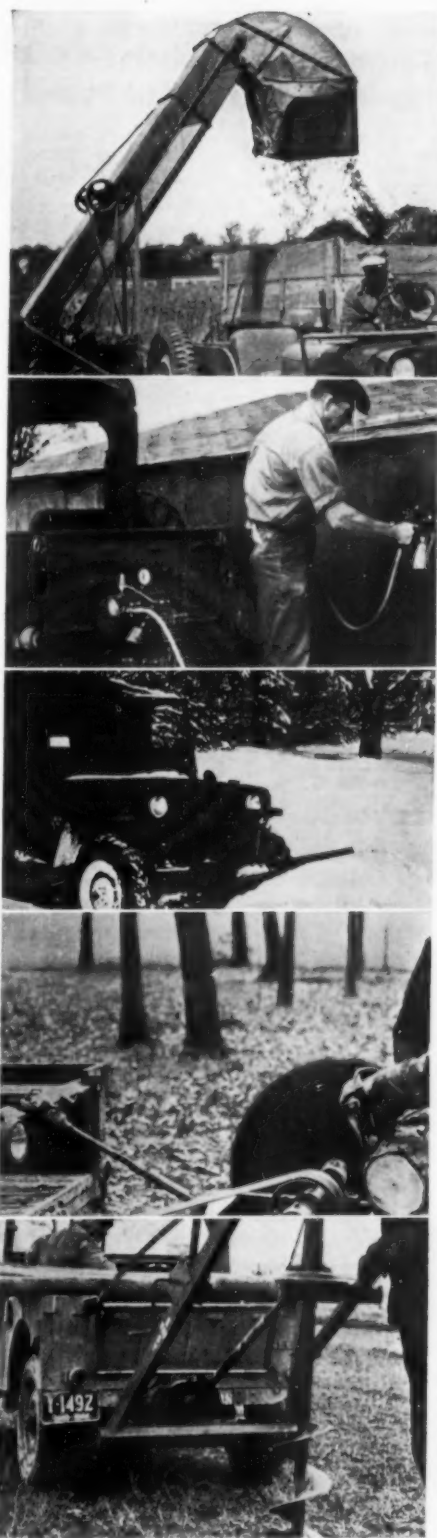
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ENGINEERING

Jeep Redesigned For Peacetime Farm Jobs

► THE JEEP, which has gone through the war as the Army's dependable mechanical burro, is now being groomed for postwar jobs down on the farm. The civilian version of this handy little quarter-ton truck-of-all-work was put through its paces near Toledo, Ohio, before a group of newspaper and newsreel men, on the 2,000-acre experimental farm of Willys-Overland Motors, Inc.

Outstanding change in the jeep's design is a power takeoff just above the towing hitch at the rear. This makes it possible to use part or all of the engine's power for such jobs as sawing wood, digging post-holes, pumping water, running cornshellers, etc. In effect, it converts the jeep into a highly mobile power plant that (Turn to page 63)



FUTURE JEEP—The postwar jeep will find many uses on the farm, such as the ones pictured in this Willys-Overland Motors photograph. From top to bottom: with a field cutter operating on rye; painting barns; clearing snow; buzzing wood; digging post holes.

AERONAUTICS

Targets for Bombers Pin-Pointed by Lead Plane

► **TARGETS** for formations of conventional bombers were pin-pointed through fog, darkness and bad weather during past months by a new Lockheed P-38 Lightning Pathfinder with special equipment, it is now revealed. The exact equipment carried by this modified Lockheed fighter is still not releasable, but its effectiveness in locating invisible enemy targets is no longer a secret.

The Lightning Pathfinder has an elongated metal and plastic pilot's nacelle that is cylindrical and blunt. Its instruments are advanced over those of the "droop-snoot" Lightning which contained all the standard bombing and navigational equipment of a heavy bomber. Like its predecessor, the Pathfinder is a two-man plane, a pilot and a bombing operator carried in its specially-constructed nose.

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NUTRITION

Favorite Drinks of the Ancients Include Lemonade

► **SIPPING** your frosted beverage on a hot day, it might refresh you to know of others, centuries ago, who enjoyed these same thirst quenchers.

Lemonade was the favorite beverage of the Mongol emperors in China, a special official of high rank being charged with keeping enough on hand. The emperor even gave Mars Sergius, the Lord High Lemonade Mixer or whatever his thirteenth-century title was, a gold-tablet diploma because of his talent for preparing cool drinks known as sherbets, particularly lemonade.

"Cold chocolate and lots of it," the Aztec emperor Montezuma probably demanded each summer in the Mexican palace which he enjoyed before America was discovered. Cortez found chocolate the national drink of Mexico—rich and poor alike enjoyed it.

Montezuma, who drank fifty pitchers of chocolate a day, preferred his with a thick froth, delicately flavored with vanilla and spices, and sweetened with sugar or honey.

No one knows when Chinamen started drinking tea, but the scholarly emperor Chen Nung praised the drink more than 4,500 years ago.

"Tea is better than wine," Chen Nung is reported to have said, "for it leadeth

not to intoxication, neither does it cause a man to say foolish things and repent thereof in his sober moments."

England began its Age of Tea not long before the Boston Tea Party, a century or so earlier a two-pound package of tea being considered a worthy present for the King.

Coffee was first enjoyed in Ethiopia, but the natives tried to keep their coffee-bean drink to themselves. Arabians borrowed coffee from the Abyssinians about the twelfth century A. D., and several centuries later England had its famous coffee houses and "speakeasies" where coffee was black marketed.

To make iced coffee to take the sizzle out of summer, place in the coffee-maker your usual supply of coffee, but use only half as much water. Poured hot over ice, the double strength of the coffee makes up for the melting ice. Serve with sugar and cream.

The Greeks became acquainted with bananas, according to historians, when Alexander the Great returned from an East Indian expedition. Oranges, which you may enjoy in orangeade, spread from their Oriental home through Europe during the Mohammedan conquests. American Indians get credit for giving maple sugar to the world.

Science News Letter, July 28, 1945

STATISTICS

One Line Admiral in Seven Is Under 50 Years

► **TODAY** one line Admiral in every seven is under 50 years of age; five years ago none were under 50. The average age of Admirals in our Navy's line of command was lowered by 2.2 years between May 1, 1940, just before the vast expansion program was launched, and May 1, 1945, according to statisticians of the Metropolitan Life Insurance Company.

The present average age of Admirals who would take command is 56.4 years whereas five years ago it was 58.6 years. During the last war it was slightly higher, being 58.7 years. This reduction has occurred despite the recall to active duty of a large number of retired officers, who comprise almost one-fifth of the total number of Admirals on active duty.

The average age of the three Fleet Admirals is 65 years; for Admirals, it is 63.6 years; for Vice Admirals, 59.6 years; and for Rear Admirals, 55 years. Rear Admirals range in age from 42 to 75 years, the difference in ages being greatest for this group.

Science News Letter, July 28, 1945

IN SCIEN

CHEMISTRY

Light Intensity Affects Vitamin C in Tomatoes

► **THE AMOUNT** of ascorbic acid, or vitamin C, in tomatoes—the most important vitamin of this fruit—varies directly with the light intensity in the growing areas, studies in the U. S. Plant, Soil and Nutrition Laboratory at Cornell University indicate.

Of this discovery, Dr. L. A. Maynard, director of the laboratory and head of Cornell's School of Nutrition, said, "investigators believe that it will be worth while to chart areas where commercial production will yield the highest vitamin content in this important food."

In the tomato research, studies by Dr. W. L. Nelson showed first of all that tomatoes as marketed vary widely in their content of ascorbic acid. Dr. Karl C. Hamner and Dr. G. F. Somers then found that most variations resulted from differences in light intensity prior to harvest.

For three years, the scientists at Cornell have shifted tomatoes around, indoors to outdoors, from sun to shade and back. They also studied vitamin content as grown commercially in different areas. In a recently completed study, the tomatoes grown in one area had one-third more ascorbic acid than the same variety grown in another nearby area. A light-measuring device showed that those grown in the first section were subject to one-third greater light intensity.

Science News Letter, July 28, 1945

ASTRONOMY

Calcium-Gas Envelope Surrounds Sun-Like Star

► **THE YELLOW**, solar-type member of the two-star team, RZ Eridani, in the constellation of the river Eridanus, is surrounded by an envelope of calcium gas, Carlos U. Cesco and Jorge Sahade of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas report in the *Astrophysical Journal*. The light of the variable star drops noticeably about once in 39 days when the subgiant, calcium-encased star comes between its brighter calcium companion and the earth.

Science News Letter, July 28, 1945

ANCE FIELDS

NUTRITION

Vitamin A Consumption Should Be Increased

► **INCREASING** the family's vitamin A consumption is good for young and old, it appears from studies of rats reported by Dr. H. C. Sherman and Dr. H. L. Campbell, of Columbia University, to the National Academy of Sciences.

Liberal intakes of this vitamin, found in such foods as butter, liver, egg yolk, carrots and green leafy vegetables, tends to postpone aging and increase length of life, Dr. Sherman and colleagues have previously reported.

Now they find that the offspring in rat families on the liberal vitamin A intake grow somewhat more rapidly and with less individual variability. This indicates, the scientists point out, that liberal vitamin A has both a favorable and a stabilizing influence on growth.

This favorable, stabilizing effect on rat growth was observed with vitamin A intakes two and four times higher than the intake considered fully enough to meet the rat's nutritional needs.

Science News Letter, July 28, 1945

ENGINEERING

Desert Air Coolers For Use in Middle East

► **HOME** air-cooling systems of the evaporating type, now used extensively in Oklahoma, Kansas, Nebraska and other states of the Southwest in semi-arid America, so interested the Prince Regent and heir apparent to the throne of Iraq in a recent visit to the United States that he probably will recommend their wide use in his country and other areas of the Middle East.

Since the climate in biblical lands and neighboring countries is much like that in these American states, coolers operating on the evaporation principle should prove successful.

In them, warm dry air is pulled by an electric fan through a moist blanket of excelsior, hay, burlap or other porous material. The wetted material and the fan are placed in a simple homemade box which is fitted into the lower sash of one window. This furnishes direct relief from heat to a single room, or, by a system of wall ducts, will distribute

cool air throughout the entire house.

The seasoned outdoors enthusiast has found the same principle effective in constructing a kind of desert cooler for foods when camping.

A frame of the size desired is covered with burlap or other porous cloth, which is kept wet, allowing evaporation to take place. The wind replaces the electric fan. The air inside the burlap enclosure is cooled enough so that perishables, even meat, can be stored safely for a number of days. In the days before electrification, western farmers found the system indispensable.

The principle is used successfully by the Army in arid countries for outdoor water-cooling purposes. It has developed a porous water bag through the walls of which water percolates very slowly and evaporates.

This cooling method is not new. It originated hundreds of years ago in warm countries when potters found that water in their crude earthen storage jugs was cooled by seepage through the porous material and subsequent evaporation.

Science News Letter, July 28, 1945

CHEMISTRY

Natural Gas Is Used In Making Calcium Carbide

► **A NEW** method for making calcium carbide, in which crushed limestone is combined with natural gas instead of with crushed coke as in present practice, is offered by two chemists of Dallas, Texas, Dr. A. J. Abrams and Dr. L. B. Cook, for patent 2,380,008. Calcium carbide is one of the most important of present-day industrial materials, being the most convenient source of acetylene used in welding torches, portable lamps, etc.

In the new method, crushed limestone is heated in an electrical induction furnace to a temperature of about 1000 degrees Centigrade, while natural gas containing a high percentage of methane is flowed through it. A second heating at a higher temperature, in the neighborhood of 1700 degrees Centigrade, completes the conversion into calcium carbide.

The new method, the inventors point out, permits the manufacture of calcium carbide in regions where coke is not cheaply available, and also provides a good economic use for methane, which has long been a chemical waif among the more easily utilizable, larger hydrocarbon molecules that make up the mixture known as natural gas.

Science News Letter, July 28, 1945

AERONAUTICS

Conveyor Belt in Planes Hastens Dropping Packages

► **CONVEYOR** belt systems in Army cargo airplanes, for unloading packages to be dropped by parachutes to ground troops, it is now revealed, decrease the time required for discharging the cargo from 40 minutes to a few seconds, and promotes safety to plane and crew by greatly lessening the time the plane was formerly required to remain exposed to enemy gunfire.

These belts, similar to the carrier belts used in industries, are endless chain-driven conveyors operated by electric motors of less than four horsepower. Power is derived from the plane's 24-volt system. The belts extend from behind the pilot's compartment to the rear door of the plane, and run at about six feet per second. They terminate at roller-bearing platforms mounted at the cargo doors, which launch the containers from the airplanes.

Each package has a closed parachute attached to it. When the package drops, a static line attached to it automatically opens the chute.

The rapidity with which packages are shot out of the plane, one closely following another, means that they land relatively near each other, making their recovery on the ground much quicker and easier.

Another important advantage of the belt system is safety to crew members, particularly to the doormen who are required to throw the packages out in planes not equipped with the conveyor belt system. A sudden lurch of a plane may throw them out along with the package.

Present installations of the conveyor belt system are in Douglas C-47 cargo-carrying aircraft.

Science News Letter, July 28, 1945

CHEMISTRY

Simple Method Prepares Transparent Plastic

► **EDWIN H.** Land, head of the Polaroid Corporation, together with Robert P. Blake, both of Cambridge, Mass., have received patent 2,380,363 on a method for preparing light-polarizing sheets of transparent plastic by simply rubbing their surfaces with brushes, rotating disks, rapidly moving bands or other friction-creating means, thereby lining up their surface molecules so that their long axes will be parallel.

Science News Letter, July 28, 1945

ASTRONOMY

Scorpius Shines in South

Jupiter is also visible early on August evenings, and after midnight, Mars, Venus and Saturn appear. Many meteors can be seen this time of year.

By JAMES STOKLEY

► THAT CHARACTERISTIC constellation of summer—Scorpius, the scorpion—now appears in full view low in the southern evening sky. Brightest star in the group is red Antares; extending from it to the left is a curved row of stars that represents the scorpion's tail, so this is one constellation that does bear some resemblance to the thing after which it is named. In the next constellation to the left, which is Sagittarius, the archer, not much resemblance to that figure can be found. This group looks more like a teapot, with the spout of the teapot just over the end of the scorpion's tail, ready to dump its hot tea upon the arachnid!

Also in Sagittarius is one of the three dippers in the sky, and the least known of the set. The four stars that form the teapot's handle are the bowl of this dipper, while the handle extends upwards and to the right. It is called the "milk dipper," possibly from its proximity to the Milky Way of which the brightest part is in this direction.

The other dippers are in the north, as usual. Most people know the big dipper, part of Ursa Major, the great bear. It is now to the northwest, with the handle curving westward and pointing to the star Arcturus. The two lowermost stars in the big dipper are the pointers, whose direction indicates the pole star, Polaris.

In addition to standing almost directly over the north pole of the earth, and so always marking the north (always, at least, in our century, though not after a few thousand years) Polaris is at the end of the handle of the little dipper. This, in turn, is part of Ursa Minor, the lesser bear. Both bears are quite extraordinary in the way they were represented on the old star maps, since in each case the handle of the dipper was taken as the bear's tail, quite ignoring the fact that bears have only very short tails!

Stars Visible

Antares is a star of the first magnitude, and so is Arcturus. In addition, three other stars of this classification are visible these August evenings. Brightest is Vega, in Lyra, the lyre, directly overhead at the

times for which the accompanying maps are drawn—i. e., 11:00 p. m., your own kind of war time on Aug. 1, and 10:00 p. m. on Aug. 15. Southeast of Vega is Altair, part of Aquila, the eagle. High in the northeast is Deneb, in Cygnus, the swan.

In the early evening in August, setting around 10:15 on the first, is the planet Jupiter. It stands in the constellation of Virgo, the virgin, of which only part is visible on the map in the west. Jupiter's magnitude is minus 1.3, which exceeds that of any of the first magnitude stars mentioned.

Beginning after midnight, three other planets appear. Mars comes up about 1:30 a. m., in the constellation of Taurus, the bull, and just north of the bright star Aldebaran. Venus, the brightest of all (magnitude minus 3.5) is in Gemini, the twins, and comes up about an hour and a half later. Saturn, also in Gemini, comes up a little later.

Every August the earth, in its revolution around the sun, passes through the swarm of meteoric material that forms the so-called Perseid shower. So every year, about this time, we see in the night-time sky a considerably larger number of meteors than we do normally. These meteors all seem to radiate from the constellation of Perseus, the champion, hence their name. Actually, the paths of the meteors are parallel and they seem to converge in the distance as the parallel

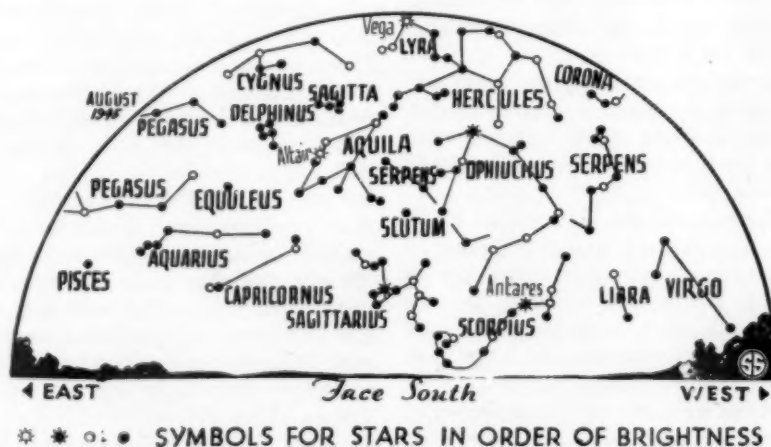
tracks of a railroad seem to run together.

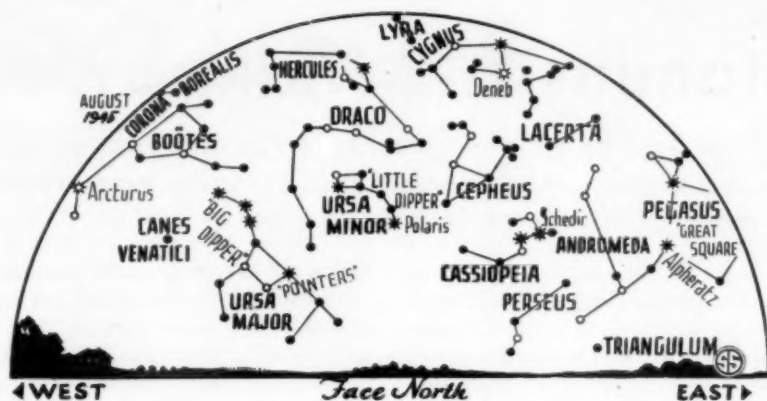
Though these meteors are seen every year, the moon may sometimes interfere. If the night of Aug. 11, during which the shower is at its maximum, happens to be that of full moon the sky is so brilliant that the meteors are scarcely visible. But this year the moon is new on the seventh. During the night of the 11th it sets quite early, making the rest of the night dark.

Meteor observing is a sport that requires late hours. Because of the way the earth turns in relation to its movement around the sun, those meteors we see before midnight have to catch up to us, but after midnight we meet them head-on, and they are more numerous. In the same way, as you walk along the street, you are more likely to pass more people going the other way than people going the same direction as yourself.

The stray meteors that are hitting the earth all the time are probably merely some of the debris that was left over when the solar system was formed, but the meteors of the regular showers seem to be the remains of comets. The Perseids seem to be associated with Tuttle's comet, last seen in 1862. Other comets are the parents of other showers. Temple's comet, for example, seen in 1866, is responsible for the famous Leonid shower which appears in November.

From the amount of light a meteor gives as it flashes through the air, it is possible to calculate its size, and this turns out to be very small, most meteors being of the order of size of the head of a pin. As this pinhead particle enters the earth's atmosphere at high speed, friction with





the air heats it and it vanishes in the flash of light that we see. Occasionally a larger mass comes in, big enough to survive the passage through the atmosphere so it can land on earth. This is called a meteorite. Apparently the meteors of the showers are all small, for there is no authenticated case of a meteorite being identified with one of the showers.

Professional astronomers always appreciate amateur help in observing meteors. Dr. Charles P. Olivier, director of the University of Pennsylvania's Flower Observatory, at Upper Darby, Pa., is an authority in this field and welcomes reports from laymen. The simplest report is to count the number of meteors that you see in half-hourly periods, say

from midnight to 12:30, 12:30 to 1:00, 1:00 to 1:30 and so on. If you know the constellations, you can mark the paths of the meteors, particularly the bright ones, on a map.

Celestial Time Table for August

Aug.	EWT	
2	7:07 p.m.	Moon passes Mars
4	11:46 a.m.	Moon passes Venus
5	7:22 p.m.	Moon passes Saturn
7	8:32 p.m.	New moon
11	1:38 a.m.	Moon passes Jupiter
12	Early morning	Perseid meteors
14	2:00 a.m.	Moon farthest, 251,400 miles
15	8:36 p.m.	Moon in first quarter
21	Midnight	Venus passes Saturn
23	8:03 a.m.	Moon nearest, 226,500 miles
29	11:44 p.m.	Moon in last quarter
31	9:07 a.m.	Moon passes Mars

Subtract one hour for CWT, two hours for MWT, and three for PWT.

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and landing conditions, and must be instructed at which thousand-foot level to approach, when to drop a thousand feet to a lower level, and when and on which strip to land. Three kinds of government workers perform these services, air traffic controllers, meteorologists and aircraft communicators.

These men rarely see the planes whose progress they chart and direct along the airways of the world. They sit before inclined posting boards with movable cards on which are recorded radio reports of planes received from pilots when miles away. As the planes approach the cards are moved downward on the board, and off the board when the plane lands.

New York's station handles both overseas-foreign and interstate-domestic communications, distinguishing it from others of the 400 stations operated by the Civil Aeronautics Administration. The big gun of the station is the intercontinental transmitter WSY at Sayville on Long Island. All overseas communication is handled by the Administration.

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AVIATION

Air Congestion Expected

Anticipating greatly increased traffic over LaGuardia Field after the war's end, officials are now planning improved facilities for radio direction.

► EXTENSIVE planning is now under way by officials concerned with LaGuardia Field on Long Island, New York City's great airport, for controlling sky traffic because of the enormously increased use of the field expected in post-war days. This means particularly radio communication with approaching planes, instructing them relative to weather conditions, what air levels to use, and when and where to land.

LaGuardia field is now one of the largest and busiest traffic control centers in the world, according to the U. S. Civil Aeronautics Administration. But, it says, a tremendous increase in business after the war may be expected, and preparations for it must be made now.

"New York's problem is complicated," the Administration states. "Here, at La-

Guardia Field, is a mixture of foreign traffic entering the streams of domestic traffic coming from every part of the continent centering at the country's greatest metropolis. New York is now, and will be increasingly, the terminus for inter-continental traffic."

Controlling sky traffic becomes increasingly important in bad flying weather. When instruments were developed to enable pilots to fly through storms and cloudy weather conditions, traffic control along the airways became necessary. Now, with many planes in the air in all kinds of weather, and scores converging on a spot like New York and other great American fields, the pilot must be helped to the ground.

The pilot must be given information by radio relative to weather conditions



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Jrl. Ad. E-96(22)

Do You Know?

Some farmers in early days disinfected grain seed by soaking in sea water.

When spinning time comes the *silk-worm*, working continuously for three days, produces a cocoon with the reelable thread from 800 to 1200 yards long.

A machine called a *penetrometer* is used to measure the toughness of meat; it is a cutting tool and records the pressure required to shear through a sample of the meat.

A policy of the U. S. National Park Service is not to disturb the *wild animal life* in any park until a scientific appraisal has been made of the probable effects of such action.

Solid *carbon dioxide* (dry ice) is so much denser than gaseous carbon dioxide that it can be used to extinguish fires outdoors in high winds, even gasoline-fed fires in wrecked airplanes.

Common tent *caterpillars*, particularly active on orchard trees in spring and early summer, hatch from egg-masses on twigs; the worms from a single egg-cluster hold together in building a tent in a crotch in the tree.

Fluorescent lamps, coming more widely into use in home lighting every day, do not require special wiring but are installed on the regular house-lighting current.

Extremely small amounts of deadly *carbon monoxide gas* in air are detected by a new solution containing palladium chloride, phospho-molybdic acid, and acetone; a measured quantity of the air is passed through the solution.

Anyone Can Use A Slide Rule

No Math Background needed if You Have the *Practical Slide Rule Manual* by J. M. Klock, Mathematician for the U. S. Navy.

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NUTRITION

Vitamins Aid Manpower

A gain of 4.1% was achieved in one year at an aircraft corporation. Absenteeism and turnover were reduced and work performance improved.

► A GAIN in manpower of 4.1% by conservative estimate was achieved in one year at the Lockheed Aircraft Corporation through a vitamin supplement given a group of its workers, Dr. Henry Borsook, of California Institute of Technology, reported.

The gain was made up of 6.6 working days per man per year through improved work performance; 2.3 days from a reduction in absenteeism; and 1.6 days from reduced turnover.

Improvement in industrial morale is considered the major factor responsible for the effect of the vitamin supplement, according to Dr. Borsook's report in the *Milbank Memorial Fund Quarterly*. The Milbank Fund is one of 12 organizations, including government agencies and industrial concerns, which supported the extensive study.

The vitamin supplement consisted in vitamins A and D from fish liver oil, three synthetic B vitamins (B₁, B₂, and niacinamide) and synthetic vitamin C. Besides this the supplement contained calcium. These were given twice a day, five days a week, for one year. A group of dispensers saw to it that every worker in the study got and swallowed his vitamin pills.

The workers in the project were a highly selected group of young men, exceptionally interested in their work. Examination before the vitamin supplement was started showed no signs of acute or severe diet deficiency disease. No dramatic results were therefore to be expected from the extra vitamins and calcium. Diet histories showed that they were eating about the same foods at the

end of the study as at the beginning.

The men all volunteered for the study, and therefore were probably interested in improving their health, had initiative when there was a chance to do something about it, and were in a cooperative frame of mind.

These traits in a worker make for better industrial morale, Dr. Borsook points out. This is another reason why dramatic results from the vitamin supplement would not be expected. Improvement in work performance and reduction in absenteeism in such a group would therefore be more impressive, it is suggested, than in one made up of workers with lower morale and poorer health at the beginning of the study.

The vitamin-mineral supplement was given to one group while a similar group received pills and capsules identical in appearance but containing no vitamins. Records of work performance, absenteeism and turnover in a third group that did not take part in the study were also used for comparison.

The effects of the vitamin supplement did not show up until the second six months of the study. Then absenteeism from all causes was 19% less for the vitamin group than for the non-vitamin group. The greatest differences were in unauthorized absences, the least in illness absences.

Non-military terminations were 27% fewer in the vitamin group for the whole year. At the end of the year personnel ratings were significantly higher on the average for the vitamin workers than for the non-vitamin group.

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SCIENCE NEWS

NUTRITION

Nuts Add Protein

► **HOUSEWIVES** whose families are tired of fish and cheese and beans when they want steak and chops may find nuts a help in solving the family meal problem. Nuts are a source of protein and high in food value. Their protein is not exactly the same as that of meat and other animal protein. They belong in the class with dried peas and beans and lentils, which make good meat substitutes when milk, eggs or cheese are served in the same meal. Nuts have the further advantage of pleasant flavor and their crunchiness adds a pleasant contrast to the soft consistency of meatless meals. They can well be taken out of the class of a between-meal snack and used as a meal-time food.

The Brooklyn Visiting Nurse Association, the Brooklyn Red Cross and health department which suggest greater meal-time use of nuts also suggest greater use of gelatin in meatless meals. The amount of protein furnished by gelatin dishes is very small, but in these days, every bit counts. Gelatin, moreover, like nuts, changes the character of familiar dishes, from soup to dessert. Fish molded in

gelatin becomes a pleasing variety from plain boiled or fried fish. The same is true of diced vegetables and fruits.

Milk is another valuable item for use in meatless meals. It provides animal protein, of the same quality as that furnished by meat. It lacks the iron furnished by meat, but this can be supplied by mustard or similar greens. The combination of milk and greens in a meal gives the complete protein and iron of meat and in addition furnishes calcium and a more than adequate supply of vitamin A, which meat lacks. Molasses is another good source of iron and its sweetness will spare the sugar.

Drinking milk is only one way of consuming it. Milk can be used in cream soups and chowders, in custards and other desserts, and instead of water for cooking breakfast cereals.

On eggs as a meat substitute, the Brooklyn health authorities point out that two eggs will replace a medium serving of meat and in addition furnish vitamin A and extra amounts of vitamin G.

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HONORABLE SERVICE—This emblem is worn in the coat lapel of all honorably discharged veterans of the present war. It stands for "honorable service to our country."

Milk is cooled immediately after milking to lessen bacteria increase; bacteria multiply rapidly while milk is warm, but very slowly when it is at temperatures between 45 and 50 degrees Fahrenheit.

In the Activity of the Endocrine Glands

The depth to which protein permeates the fabric of metabolic life, and the role it plays as "raw-material" and component of elaborated secretions is indicated in hormonal composition.

Thyroxine, the active principle of the thyroid gland, is an iodinated phenylether derivative of the amino acid tyrosine. Epinephrine, the active principle of the adrenal medulla, is also a tyrosine derivative. Insulin, as elaborated by the islands of Langerhans, has been isolated in crystalline form and found to be a protein.

Only from the proteins of the foods eaten can the organism derive the protein substances required for these complex purposes.

Among man's protein foods meat ranks high, not only because of the percentage of protein contained, but principally because its protein is of highest biologic quality, applicable wherever protein is required.



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Precautionary Destruction

► ELM TREES have long been favorites with the people of this country. Elms are beautiful in themselves, especially the American or white elm, with its long, sweeping, arch-forming branches. We think, too, of the picture of George Washington accepting his commission as commander of the Continental forces under the great elm in Cambridge, Mass., and of other elms that have backgrounded memorable scenes in our history.

Yet in the face of this comes a recommendation from the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, that farmers and other owners of mixed hardwood

timber should concentrate their attention on the elms in them, especially if these trees show any signs of being sick, and cut them down and use the wood as quickly as possible. At first blush, it seems downright unpatriotic to make such a demand.

There is good practical reason, however, for this move. American elms are threatened by two serious scourges, the well-known though misnamed Dutch elm disease and a less-advertised though probably equally dangerous malady known only by its technical title, phloem necrosis. Either disease is almost inevitably fatal to an elm if it gets a firm hold on the tree: the only thing to do with a tree in which the infection has become established is to cut it down and burn it, to prevent it from spreading the disease to trees still unattacked.

Squads of disease-fighters have been doing this for several years in the areas where these diseases are most threatening. During the war this work has been seriously handicapped by the manpower shortage, so it has not been possible to extend the street and highway patrols out into the woods. Yet elms in the woods are just as likely to become diseased as those in the open, and much less likely to be detected while they are in the dangerously infective stage. It is for this reason that the prompt felling and utilization of any timber-lot elm that shows wilting or dead foliage is now recommended.

The recommendation even goes beyond the destruction of trees known to be diseased. It is suggested, in view of the present shortages of timber and firewood, that elms be cut before other trees. Elm has never been much esteemed as lumber, but it can yield posts and other rough timbers, where sawing or splitting is not required. Such elm logs as are cut for these purposes during the warm months should have their bark removed and burned, to kill off the disease-causing fungi and the bark beetles that serve as carriers for the infection.

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Just Off the Press

CONTROLLERS FOR ELECTRIC MOTOR: A Treatise on the Modern Industrial Controller with Typical Applications to the Industries—Henry Duvall James and Louis Edwin Markle—*McGraw*, 324 p., illus., \$5.

ELECTRICAL POWER USES IN MARINE SERVICE—John M. Dodds—*McGraw*, 444 p., illus., \$3. Vol. 3, Marine Electricians' Library. A reference handbook.

THE GIST OF MATHEMATICS—Justin H. Moore and Julio A. Mira—*Prentice-Hall*, 726 p., illus., \$5. Prentice-Hall mathematics series. 3rd printing.

DUTREX 20 AND 25, Plasticizers for Vinyl Chloride Resins—Shell Oil Company, 13 p., paper, illus., free. Report No. 1.

848 MEN—AND YOU—*Socony-Vacuum*, 46 p., paper, illus., free. The story of Socony-Vacuum research and product development.

HOW TO GET AND KEEP GOOD HEALTH—Stella Regina Dolan, ed.—*Ackerman*, 240 p., \$2. 23 experts tell how to maintain health.

AN INTRODUCTION TO MEDICAL SCIENCE—William Boyd—*Lea*, 365 p., illus., \$3.50. 3rd ed., thoroughly revised.

A MANUAL OF SURGICAL ANATOMY—Tom Jones and W. C. Shepard—*Saunders*, 195 p., illus., \$5. Prepared under the auspices of the Committee on Surgery of the Division of Medical Sciences of the National Research Council.

PSYCHIATRY IN MODERN WARFARE—Edward A. Strecker and Kenneth E. Appel—*Macmillan*, 88 p., \$1.50.

PSYCHOLOGY FOR THE ARMED SERVICES—Edwin G. Boring, ed.—*Infantry Journal*, 533 p., illus., \$3. Prepared by a Committee of the National Research Council with the collaboration of many specialists.

SCIENCE, THE ENDLESS FRONTIER—Vannevar Bush—*Supt. of Doc.*, 183 p., paper, 30 cents. A report to the President on a program for postwar scientific research.

SCIENTIFIC SOCIETIES IN THE UNITED STATES—Ralph S. Bates—*Wiley*, 246 p., \$3.50. A publication of the Technology Press, Mass. Inst. of Tech.

TECHNIQUES OF GUIDANCE: Tests, Records, and Counseling in a Guidance Program—Arthur E. Traxler—*Harper*, 394 p., illus., \$3.50. Education for Living series.

Science News Letter, July 28, 1945

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✿ **FULCRUMED** fork is any garden fork with a recently patented attachable leg fastened under the handle relatively near its lower portion. This is to help in lifting the load after the fork has been pushed into the ground.

Science News Letter, July 28, 1945

✿ **ELECTRONIC** color detective, that scientifically selects paint which absorbs the least amount of light and heat of the sun, plots an exact curve of the amount of light reflected by a paint sample, detecting particularly invisible red rays. A shade of battleship gray that absorbs the least red was thus selected to aid in keeping the ship cool.

Science News Letter, July 28, 1945

✿ **BURIAL CASKETS** made of plastics, sealed electrically, may soon be available under a recent patent. The plastic is the type that may be softened by heat. Electric heating elements, embedded in the body portion, form a tight joint with the cover when the house current is applied to them.

Science News Letter, July 28, 1945

✿ **LIFE PRESERVER**, improved type, is a vest-like garment that supports the wearer in the water in an upright position, but inclined slightly backward. The preserver, filled with a removable buoyant material, is reversible, fits snugly about the waist with a cord, and has a strap handle on the back to assist the rescuer.

Science News Letter, July 28, 1945

✿ **WIRE RECORDER** sets, attachable to home radio receivers, record music or



words from the air or from the microphone by moving a long thin wire across the poles of a magnet. When the wire is re-run across the magnet, the record is reproduced by the loudspeaker.

Science News Letter, July 28, 1945

✿ **COMBINATION SHOVEL**, pick and axe, has a handle with one threaded end on which the shovel blade may be screwed, and pivoted joints on the sides for the pick and axe opposite each other. When not in use, pick and axe are turned lengthwise with the handle. A special catch holds either in working position when desired.

Science News Letter, July 28, 1945

✿ **COMBINATION** ice and roller skate has the ordinary foot plate mounted on

single front and rear wheels. Around the rim of each wheel is a relatively narrower band of hard metal with sharpened outer edges for digging into the ice when the wheel is tilted sidewise in ice skating.

Science News Letter, July 28, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 269.

From Page 55

can carry 40 horsepower to any corner of the farm and then put it to work there.

The civilian jeep, like its Army prototype, can still "pull like a mule and climb like a goat," but its gear ratios and clutch area have been changed to fit its pace to the needs of farm life. It can operate as slow as three miles an hour in plowing, harrowing or seeding fields, it can speed up to 60 miles an hour as a passenger vehicle or a light pick-up truck, or it can run at an intermediate rate towing a trailer with a load of as much as 2½ tons.

Other changes include more comfortable seat cushions, larger headlights, redesigned steering gear, gear-shift lever on steering column, tail-gate on truck section.

Some of the dozens of farm tasks which the new jeep can perform are: mixing cement, plowing snow, filling silos, baling hay, spraying orchards, spray-painting or whitewashing buildings, stretching fence wire, spreading fertilizer.

Science News Letter, July 28, 1945

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